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CANADA THISTLE.

(*Carduus arvensis* (L.) Robs.)

In all the history of weeds in America none has been more complained of than the Canada thistle (fig. 1). A century ago it was regarded by the farmers of New England as the greatest pest of their fields. When the sons of these farmers moved West the Canada thistle went with them. It grows vigorously, sometimes spreads rapidly, and is always difficult to kill by ordinary cultivation. It forms dense patches, sometimes to the complete exclusion of other plants, and its abundant sharp spines make it disagreeable to handle. To these characters are due its traditional reputation in the Northeastern United States as the worst of all weeds. With little doubt, however, it causes in the aggregate less real injury to farm products than does bull thistle, ragweed, or pigeon grass, and its distribution is confined to a smaller area than that of any of these weeds.

FIG. 1. Canada thistle, showing horizontal roots, young shoots, and mature plant in flower.

NAMES.

The plant received the name Canada thistle in this country soon after the war of the Revolution, as it was supposed to have been introduced from Canada. This name is now used generally in both Canada and the United States. In England the plant is known by the names corn thistle, green thistle, and creeping thistle. In Australia

and New Zealand it is often called California thistle. The names boar thistle, cursed thistle, dog thistle, field thistle, and waste thistle have also been applied to it.

In different botanical handbooks published during the past twenty-five years this plant has been described under three different technical names, *Carduus arvensis*, *Cirsium arvense*, and *Cnicus arvensis*. Recent studies upon the synonymy confirm *Carduus arvensis* as the correct name.

DESCRIPTION.

Canada thistle is usually first introduced into new localities by the seed. The seed germinates and a rosette of leaves lying almost flat on the ground is first formed. These leaves are prickly on the margins, somewhat woolly on the under surface, but green and nearly smooth on the upper. The following year a flowering stalk branching at the top grows up to a height from one to three feet (20 to 100 cm.), rarely higher. The stalk is more slender than that of most other thistles and bears very few spines (fig. 2, *a*). The earlier lower leaves are four to eight inches (10 to 20 cm.) long and about one-fifth as wide. The later leaves on the upper parts of the stalks and branches are smaller. The lower surfaces of the earlier leaves are at first somewhat woolly, but the upper surfaces of all the leaves are bright green and smooth or slightly hairy. They are uneven or ruffled and the margins are irregularly toothed and very spiny, the longer spines being one-fifth to three-eighths of an inch (5 to 8 mm.) long. The flowers are rose-purple, rarely white, in heads one-half to seven-eighths of an inch (1.5 to 2 cm.) in diameter, clustered at the ends of the branches. The green bracts surrounding the flower heads (fig. 2, *b*) are entirely devoid of hard, stiff prickles or spines. Usually a comparatively small number of the flowers produce seeds (strictly, akenes) and in many localities no perfect seeds have been found. The abundant white, feathered pappus or down (fig. 2, *c*) is usually formed, however, even though the seeds are not developed. The seeds are smooth, brown, about an

FIG. 2. Canada thistle. Detail: *a*, main stem and leaf; *b*, flower head; *c*, seed with pappus, natural size; *d*, seed, enlarged, with pappus detached.

eighth of an inch (3 mm.) in length, nearly cylindrical, pointed at the lower end and with a slight projection from the center of the truncate circular apex (fig. 2, *d*).

When plants grow from the running roots in the fall they send up shoots with rosettes of leaves smaller than those produced by the seedlings, but when they grow during the spring and summer the rosette stage is usually omitted. The running root is light yellow or nearly white, smooth, cylindrical, and about a quarter of an inch (7 mm.) in diameter (fig. 1). Numerous rootlets are scattered along its whole length, but there are no nodes, scales, or buds, such as are found on the underground portions of the shoots. It is, therefore, technically a root, and not a rhizome or rootstock, as it has often been called. The running root extends horizontally at a distance of three inches to three feet below the surface of the ground, the lower depths being reached usually where the soil is deep and porous. It will send shoots to the surface through at least three feet of hard-packed soil. This fact has been repeatedly noted where the plants on vacant lots in Washington have been covered by the brick-like soil drawn from excavations and thoroughly packed by the successive cart-loads hauled over it.

OTHER THISTLES MISTAKEN FOR CANADA THISTLES.

Several other thistles are often mistaken for Canada thistles. As these are chiefly annuals or biennials, differing very much from the Canada thistle in their injurious characters, and requiring very different treatment for their eradication, it is important that they be distinguished.

The most common and most widely distributed of these is the bull thistle, *Carduus lanceolatus* (fig. 3). This is an introduced biennial species. It is distributed exclusively by the seeds, but these are produced in such great numbers that the plant multiplies very rapidly. It often forms patches several acres in extent on newly cleared land, but in old fields the plants are usually more scattered. It seldom persists in any great quantity and is readily destroyed by cultivation. It may be easily distinguished by its greater size and much larger heads, with spine-pointed scales, and by its leaves the upper surfaces of which are always rough, like a cat's tongue.

In the South Atlantic States bird's nest thistle, *Carduus spinosissimus*, is often mistaken for Canada thistle. This is a native perennial thistle, which blooms early in spring and is sometimes troublesome in early crops and in meadows. It is not regarded as a serious pest, however, and is easily eradicated by cultivation or by increased fertilization and thick seeding. It spreads by the seeds alone, as it has no running roots. The bird's nest thistle may be recognized by its short, thick stem, only 10 to 20 inches high, bearing at the top two to five large heads, surrounded by very spiny pinnate scales.

On the Pacific coast milk thistle, *Silybum marianum*, has been mistaken for Canada thistle. Milk thistle is an introduced annual plant that has become abundant in some places in California and in waste ground about eastern cities. It may be recognized by its coarse, thistle-like habit, large leaves, mottled with white, and milky juice.

FIG. 3. Bull thistle. *a*, piece of main stem, with leaf; *b*, flower head; *c*, seed, with pappus, natural size; *d*, seed, enlarged, with pappus detached.

The curled thistle, *Carduus crispus*, introduced at a few points from Vermont to Pennsylvania, and in ballast about seaports, has been mistaken for the Canada thistle, and in this case the resemblance is very close. It has the same slender habit, small heads, and light-colored foliage. The best characters for distinguishing between them are the prickly winged stems, the spine-pointed scales, and the plumeless or non-feathered pappus bristles of the curled thistle, as compared with the feathered pappus of the Canada thistle.

In case of doubt as to any plant supposed to be Canada thistle, the best method is to destroy it so as to prevent seed production—after mailing to the Department of Agriculture for identification some of the leaves and flower heads. Specimens of Canada thistle, or of plants supposed to be Canada thistle, are especially desired from localities where its presence is not indicated by marks on the accompanying map.

HISTORY.

The Canada thistle was a troublesome weed in the fields of southern Europe as early at least as the beginning of the sixteenth century. By the middle of the eighteenth century it had spread throughout the

greater part of Europe, and now it is found in western Asia, northern India, Australia, New Zealand, and North America. In all regions where it has become naturalized it has the same reputation as an aggressive and pernicious weed.

INTRODUCTION INTO AMERICA.

Some of the earlier American botanists held the opinion that while the Canada thistle had doubtless been introduced into New England from Europe, it was probably indigenous in western Canada. It now appears very improbable that it is indigenous anywhere on the American Continent. It was evidently introduced into the French settlements in Canada earlier than into the English and Dutch colonies of New England and the Middle States. It is reported to have been found about the residences of French missionaries in Canada early in the seventeeth century. There is a tradition that it was purposely introduced into Canada by the French for feeding swine; but there appears to be no just ground for this tradition, as there is no record that thistles were ever used to any considerable extent as food for swine in Europe.

It is said to have been introduced into eastern New York with the hay and camp equipage of Burgoyne's army in 1777. It probably reached Vermont at the same time or previously, as it was recognized as a troublesome weed in that State earlier than in New York. The farmers of Vermont had become so greatly alarmed by its progress that a law was passed by the legislature in 1795 directing its destruction on all lands within the State. In 1813 the legislature of New York passed a law authorizing certain towns to pay rewards for its destruction. These laws were well enforced at first, as they were passed at the request of the farmers directly interested. But the farmers soon learned that the thistle could be controlled, and then their alarm ceased and with it their interest in the complete extermination of the plant. Since then successive generations have attacked the thistle spasmodically, soon becoming satisfied of their ability to keep it in check, and relaxing their efforts. The thistle has never relaxed, however. It has continued to grow and to spread each year, although it has been exterminated on many individual farms. As early as 1850 it had spread throughout New England, Pennsylvania, and eastern Ohio, and had gained a foothold in scattering localities in many other States. During the war its range was extended southward all along the line east of the Missouri River, and in more recent years it has been extending westward.

PRESENT RANGE.

The Canada thistle is now found from Maine to Virginia and westward to North Dakota and Kansas, and on the Pacific coast from Washington to northern California. The States south of Virginia,

Kentucky, Missouri, and Kansas are practically free from it, and it has become established in only a few localities in the Rocky Mountain region and Great Basin. It is abundant and troublesome from southern Maine to Maryland and westward to Indiana and Wisconsin, and in restricted localities in some of the States bordering this area, also in the Pacific coast States.

NOT LIKELY TO BE TROUBLESOME IN THE SOUTH.

Very few reports of Canada thistle have been received from the Southern States, and when these have been investigated it has nearly always proved that other thistles were mistaken for Canada thistle. The true Canada thistle was introduced several years ago into Apa-

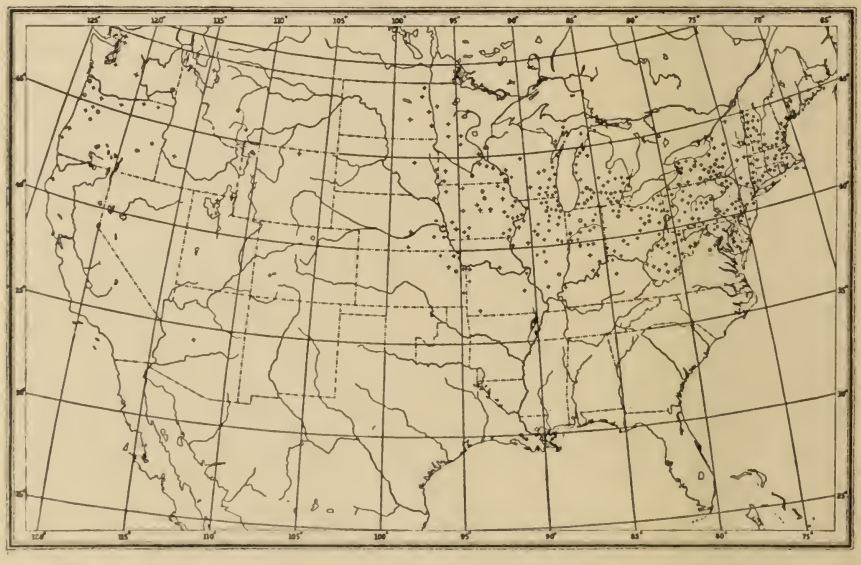

FIG. 4. Map showing distribution of Canada thistle in the United States as indicated by reports received at the Department of Agriculture. + Record or report. ° specimens seen.

lachicola, Fla., but it soon died out, although no efforts were made to destroy it. In 1893 it was introduced on ballast ground at Mobile, Ala., but none of the plants bore perfect seeds and only one plant appeared in 1894. Canada thistle seeds were undoubtedly carried to many parts of the South in hay during the war, and during recent years the increased traffic between the Northern and Southern States has given abundant opportunity for the introduction of thistle seeds. These facts indicate that it is not likely ever to become such a pest in the South as it is now in the North. It may be expected, however, in the rich valleys in the Piedmont regions, where the climatic conditions are similar to those of the mountain regions of Pennsylvania.

DANGER OF ITS INTRODUCTION IN NORTHERN PRAIRIE STATES AND ROCKY MOUNTAIN REGION.

The Canada thistle has long been abundant and troublesome in Manitoba and is now found at many points along the Canadian Pacific Railway from Winnipeg to the Pacific coast. In most of the localities where it has been introduced in Minnesota, North and South Dakota, Colorado, and Idaho, it thrives and shows a disposition to spread. The climatic and agricultural conditions throughout a large part of this area preclude the employment of many methods for combating the thistle which are in common use in the East, and at the same time the practice of irrigation will aid in disseminating the seeds. Therefore, if the plant is allowed to become widely established here, it promises to be even more troublesome than it has been in other parts of the country.

METHODS OF DISTRIBUTION.

The Canada thistle spreads over large areas or travels long distances by means of its seeds. It spreads into patches through its perennial running roots. Both of these means are effective in their way. Perfect seeds are not often produced until after the plants have become well established and have spread to some extent by the running roots. In some localities in Wisconsin and Iowa close observation of the plants for several years has failed to discover perfect seeds. The plants appear to be somewhat erratic in this respect, however. In 1894 very few were found at Washington bearing perfect seeds, while in 1895 nearly all bore perfect seeds, though such were produced by less than half of the flowers in each head. In 1896 the plants were again seedless. All three seasons were alike exceptionally dry for this region. In 1899, an abnormally wet season in Washington, they were seedless, and no seedlings were found in the spring of 1900. There were no apparent fungus or insect enemies to account for failure to produce seeds. The fact that the plants are imperfectly diœcious does not fully explain these differences in seed production.

DISSEMINATION OF SEEDS BY NATURAL MEANS—WIND AND WATER.

The seeds are carried from farm to farm by the wind, and along streams they are carried by the water. The seeds are mature from midsummer onward through the season, and, as they are easily detached from the heads by slight breezes, most of them are disseminated before the hard winds of late autumn and winter begin to blow. The feathered pappus is very abundant, and the seeds are comparatively light, so that they may be carried a mile—rarely farther—in the windstorms that often precede summer thundershowers, but they are too heavy to float upon light breezes or in still air. Perfect seeds are easily detached from the pappus, and the thistle down so often seen floating about is either that from which the seeds have already fallen or that from flowers which

did not bear perfect seeds. The distribution caused by the wind is principally from waste land and fence rows to cultivated fields and from field to field. This distribution is confined to short distances, and is generally in the direction of prevailing winds.

Every rain falling on a hillside thistle patch washes the seeds down the slope. Seeds from a patch of Canada thistles growing in a mountain valley are disseminated by freshets all along the banks of streams below. Transportation by water becomes a special danger in regions where irrigation is practiced, as the seeds of thistles growing on the banks of rivers or irrigation canals will float down the streams and ditches and be deposited in the fields under the best conditions for propagation.

DISSEMINATION OF SEEDS BY ARTIFICIAL MEANS.

The dissemination of seeds by natural means accounts in part for the distribution of the Canada thistle over limited areas, but were it not for the unwitting or careless aid of man its progress would be comparatively slow. The seeds were first brought from Europe to America by man. They have been transported from Europe to this country in impure seed. The hay or straw used in packing the cheaper kinds of crockery is a very frequent means of introducing these seeds. Thistles are brought to the barn in hay or grain. The seeds reach the straw stack or manure heap and are taken back to the fields. They are carried from field to field by harvesting machinery and from farm to farm by thrashing machines. In one county in Oregon the Canada thistle was first noticed where a thrashing machine from the East was first used. It would have cost less than 10 cents to have cleaned the machine before it left the thistle-infested region where it had been used in the East, but it would now probably cost thousands of dollars to exterminate the thistles that have sprung from that introduction of seeds.

Dissemination in field seeds.—As an impurity in commercial seeds, Canada thistle seeds are found most frequently in Canada blue grass, Kentucky blue grass adulterated with Canada blue grass, and in the clovers, especially alsike. If the thistles are cut and thrashed with any of the clovers or grass seeds it is often impossible to completely separate the seeds. The pappus or down never clings to perfect thistle seeds after passing through a thrashing machine. The seeds are so nearly of the same color as those of Canada blue grass that they are detected with difficulty, even by trained eyes; but the yellow thistle spines, which are more readily seen, indicate when present that the seeds may be present also. Canada thistle seeds are sometimes found in wheat and oats, but their presence in these grains indicates very careless cleaning, as they are so small that they may be easily separated by proper screening.

Distribution in hay.—During the past fifty years the transportation of hay has been one of the most potent agencies in the dissemination of Canada thistle seeds. During the war immense quantities of hay were shipped from thistle-infested regions to the armies in the field. Since that time baled hay has been shipped very extensively to lumber camps and to workmen constructing railways. An evidence of this is left in the patches of Canada thistles about deserted lumber camps and along new railway lines. Thistles may frequently be found in the bales of hay received for city consumption and an abundant growth of thistles is often seen on farms where manure from city stables is used.

METHODS OF ERADICATION.

A great many methods for killing the Canada thistle have been devised, and many have been described in various publications, yet there still seems to be need of a more widely disseminated knowledge of those which have been tried and found successful. Mr. Ambrose Stevens in an excellent essay on the Canada thistle, published in the Transactions of the New York Agricultural Society for 1846, states that no entirely new methods for the destruction of the thistle had been discovered or developed for at least forty years previous to that time. He gives a summary of about twenty-five different methods, the details and results of which had been published in agricultural papers. Each of these methods had proved successful and each had proved unsuccessful, showing a wide variation in results from the same treatment where no account was taken of the surrounding conditions. All of the methods there discussed are still used and are still meeting with success and failure. Mr. Stevens's conclusions, deduced from a careful study of his own experiments and from those of others, are, in general, applicable to present conditions throughout the thistle-infested region, although experience has proved some of the statements to be too sweeping. They are as follows:

Whatever will effectually exclude the plant from the light and air will destroy it. This may be done by plowing, in some soils, and in others by a close grass sod. Plowing, if repeated frequently in soils where the root does not descend beyond the reach of the plowing, will, in dry seasons, always destroy the thistle, and often in moist ones. In soils which are light, deep, rich, friable, and, of course, permeable to the air, and are in some measure always moist, plowing will always fail.

Wherever a dense sod can be formed, the thistle may be destroyed by seeding. The grasses, wherever they are adapted to the purpose, will be found the easiest means of destruction, although not so rapid as plowing, hoeing, salting, or burning, where these latter are available.

In all uplands, where the soil is of a depth admitting the root to be reached and affected in its whole extent by the plow, hoe, fire, or salt, the thistle may be destroyed by these means, and they will be found the most rapid ones.

In all bottom lands where the root descends deep and the soil permits access of air, neither the plow, hoe, fire, nor salt will destroy the thistle; here the grasses should be applied, and will be found the best destroyers.

Mowing will destroy those parts of the thistle which have thrown up flowering stalks, and will not in the least affect those which have not. Mowing should take place when the plant is in bloom.

Whatever limits the thorough application of the means of destruction, will proportionately diminish success. Hence it will be found difficult in very stony grounds ever to eradicate the thistle; the plow can not effectually reach its roots, and such ground is rarely a good grass bearer. Salt and sheep, with the scythe, will be found best for stony grounds. In grounds filled with stumps, where the soil is rich and will grow a dense sod, the grasses will be best, and in such the plow should not be used, as it will not effectually reach all the roots. Fences that obstruct the application of the plow or hoe should be removed.

If it be desirable to destroy the thistle by the grasses it will be found best to make the land rich by manure. This will force the grass and enable it more readily, by vigorous growth, to kill the plant. And in the application of all remedies care should be taken to reduce the soil by proper cultivation to a fine tilth, that all the seeds of the thistle in the ground may germinate and not lie dormant. The seed is very hardy, and escapes all the ordinary means of destruction, except fire.

The following specific methods of treatment have been found most successful in subduing or destroying the Canada thistle:

Mowing twice each year, just after the flowers open, usually in June and August, will keep the plants in subjection. This will prevent the production of seeds, and thus serious injury to crops may be avoided, but it will rarely cause the death of the thistle roots except in good grass land or in wet seasons, and will therefore need to be repeated each year. It is generally as effective as pulling or grubbing twice a year. This plan is recommended for roadsides and waste land, and for meadows and pastures where the methods for complete eradication seem to be too expensive for immediate application. Canada thistle plants are often killed by mowing them just as a heavy rain sets in late in June or early in July, when they are in bloom and the stalks are hollow. The rain, keeping the cut surface moist and filling up the hollow stalks, favors the growth of fungi, inducing decay, which often extends down to the root system.

A more effective method, especially in dry seasons, is to go over the ground once during every two weeks after the mowing in June and cut off every thistle about two inches below the surface with a hoe or spud. A spud made of a strong, sharp chisel on the end of a pitchfork handle will be found most convenient for this work. The second year the spudding should begin as soon as the thistles show in the spring, and should be continued through the season, although there will be few to cut after midsummer, if the work has been well done. The land should be looked over occasionally each year afterwards to detect and destroy plants that may spring from dormant seeds.

Salting thistle plants every week or two during two successive growing seasons in pastures where sheep have access to them, usually destroys them.

Small patches of the plant have been killed by covering them with straw, tanbark, or apple pomace; but these methods can not be recommended. Canada thistle roots will live for three years or longer in porous soils under straw stacks or piles of tanbark, and they are likely to creep out and send up shoots. Apple pomace, applied thick enough to kill the thistle, ruins the land for the growth of any crop for several years; but this period may be shortened by repeated applications of air-slaked lime.

The application of chemicals or some substance that, being absorbed into the tissues of the plant, will kill the roots, is recommended as one of the best methods for destroying small patches. Trials on a small scale, proving the ease and effectiveness of this method, may encourage its extension to larger areas. The following substances given in the approximate order of their effectiveness, beginning with the poorest, have been used for this purpose: Salt, brine, quicklime, kerosene, gasoline, turpentine, lye, sodium arsenite, carbolic acid, muriatic acid, nitric acid, sulphuric acid. Salt, brine, and quicklime are most effective when applied liberally to places where the thistles have been grubbed out. Brine is often applied hot with good effect. Salt and kerosene are often used together. Kerosene, gasoline, turpentine, and lye may be applied in the above manner, or they may be poured into the hollow stems when the plants are cut in flower. This process is too laborious to be recommended, except in case of small patches. Strong lye and the other substances mentioned will be found effective if applied to the top of the plants when they are growing most rapidly during May and June. None of these substances, except salt, injure the land to any appreciable extent if applied only in sufficient quantities to kill the thistles. Salt must be applied in such large quantities that in some cases it may not be washed out of the soil for two or three years. The stronger acids and alkalies are somewhat difficult and dangerous to handle, because of their corrosive properties. They have to be stored and applied in glass bottles. Crude sulphuric acid, which is much used in eastern Pennsylvania, is applied by means of a glass bottle with a glass tube or a clay pipestem running through the cork. Of these strong chemicals, a few drops applied to each plant are sufficient. Carbolic acid and the less corrosive substances may be applied by means of an ordinary machine oil can, or a watering pot with a small rose or nozzle. A teaspoonful of strong commercial carbolic acid applied to each plant is sufficient. This should be applied without dilution on the buds and tender upper leaves of the growing plant. Care should be exercised to prevent the poisoning of stock from chemicals applied to thistles in pasture fields.

Patches of Canada thistles discovered in grain fields at harvest time, as they often are, should be left standing until after the crop is removed, then mowed and burned on the spot as soon as they are

dry enough. This treatment arrests the distribution of seeds and, in some cases, it has killed the plants.

In shallow, dry soils summer fallowing during a dry season will destroy the thistles.

The first plowing should be done when the plants are in bloom in June or early in July. If they can not be turned under cleanly with chain or jointer, they should be mowed and burned before plowing. The land should be alternately harrowed and cross-plowed as often as any green plants appear until it is time to sow winter grain. Thorough cultivation with hoed crops will produce almost the same effect if the cultivation is continued through the summer. In this case a hoe must be used to destroy thistles growing in the hills and others that escape the cultivator. In wet seasons cultivation generally fails to kill the roots. After cultivating either in barren fallow or with hoed crops, the land should be thickly seeded in August or September with crimson clover, rye, or winter oats where the winter climate will permit the growth of these crops. These may be pastured during the early spring and then plowed under. Winter wheat and other grain crops that will permit the thistle to remain undisturbed during spring and early summer should not be grown. Where the climate is too severe for winter crops, cultivation should continue late in the fall and begin early in spring. Thistle-infested areas ought to be plowed and cultivated by themselves to avoid scattering roots to other parts of the field.

Canada thistles that persist in spite of cultivation on low lands may soon disappear when the land is seeded and made to produce two good crops of hay each year. On soils not adapted for permanent grass lands it is often possible to raise good crops of annual grasses which will choke out the thistles. Millet, fodder corn, or sorghum are good crops for this purpose, and good results have been obtained by the cultivation of rape.

Dr. T. J. Burrill, in Bulletin No. 12, Illinois Agricultural Experiment Station, recommends the following method as the "best for exterminating Canada thistles when in full possession of tillable ground:

"1. Cut the thistles when in full bloom [July] as close to the ground as possible.

"2. Plow about 3 inches deep and sow millet or Hungarian grass, seeding heavily; harrow. This may follow the preceding at once or after some two weeks' delay.

"3. In September plow under the crop or save it for hay, as desired. At all events, plow and seed liberally with rye.

"4. Plow under the rye in May and seed again with millet or Hungarian grass, or plant to some hoed crop [corn] and give the most thorough cultivation, with continual searching for and destruction of every remaining thistle.

"5. Continue the clean cultivation and sharp lookout for thistles another year."

NATURAL ENEMIES.

Although the larvæ of several different kinds of insects live in the stems of Canada thistles, while others feed more or less upon the roots and still others eat the foliage, they seem to produce comparatively little effect upon the vigor or productiveness of the plants. The American goldfinch or "yellow bird," often called the "thistle bird," is sometimes unjustly accused of scattering thistle seeds. It does scatter the down from which it has detached the seeds. Thistle seeds form one of its favorite kinds of food, and it is undoubtedly one of the best natural agencies tending to keep the thistle in check.

Among fungus diseases which attack Canada thistle, the thistle rust, *Puccinia suaveolens,* is the most destructive. This often prevents the production of seeds and sometimes kills the plant to the ground. It is most effective during wet seasons, but even under the most favorable conditions it rarely spreads so as to destroy all of the plants in a patch. Experiments made thus far in New York, New Jersey, and Pennsylvania, in introducing the rust into uninfested patches, indicate that while it may often aid materially in checking the growth of the thistles, it rarely exterminates them, and its action is too uncertain to warrant more than a qualified recommendation of its use as a thistle-destroying agent.

STATE LAWS RELATING TO CANADA THISTLE.

Canada thistle is proscribed as a noxious weed by the laws of the following twenty-four States:

California.	Kansas.	Nebraska.	Pennsylvania.
Connecticut.	Kentucky.	New Jersey.	South Dakota.
Delaware.	Maryland.	New York.	Vermont.
Illinois.	Michigan.	North Dakota.	Washington.
Indiana.	Minnesota.	Ohio.	Wisconsin.
Iowa.	Missouri.	Oregon.	Wyoming.

In most of these States penalties are prescribed for permitting the thistle to produce seeds. Illinois is the only State in which the law directs that the plants be killed, and this also the only State in which the law appears to be vigorously enforced. In several counties in different parts of the State Canada thistles are reported as practically exterminated through the rigid enforcement of the law. In some of the large cities of this country where there are thousands of acres of vacant lots grown up to thistles and other weeds, neither the thistles nor the thistle laws have received much attention.

The majority of progressive farmers know that Canada thistle can be exterminated on their farms, but they need the aid of a good law, well administered, to prevent their well-tilled fields from being seeded

by the thistle patches of careless neighbors. While it is not regarded as necessary or desirable that the Canada thistle should be treated in a law distinct from laws relating to other weeds, it is earnestly recommended that it be proscribed by just and comprehensive laws in all of the States where it is at present abundant, and especially in those States of the Rocky Mountain region and Great Basin where it is now becoming established. An effort should be made to enforce the laws that now exist unheeded in some of the older States, and if they are found inadequate, they should be repealed and replaced by better ones.

LYSTER H. DEWEY,
Assistant Botanist.

Approved:
JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *June 17, 1901.*

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